

5. SURPLUS FACILITIES



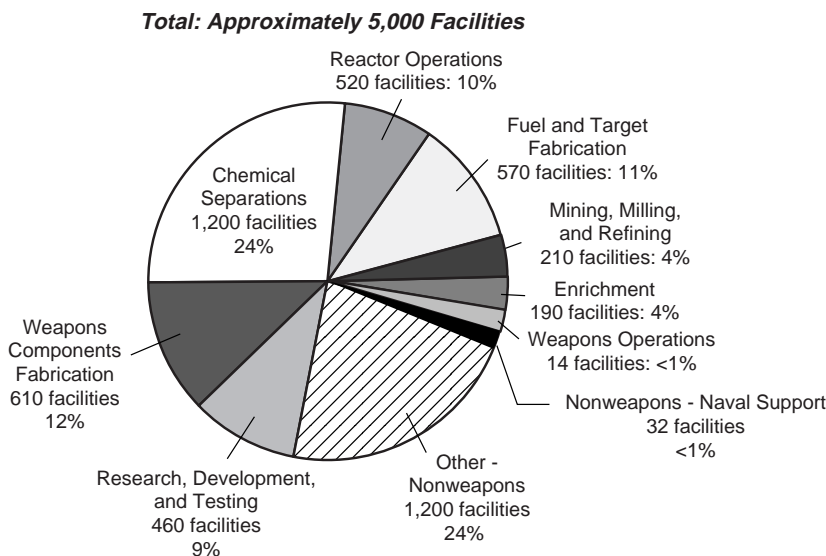
Savannah River Site heavy water facility. For 30 years, this facility concentrated small fractions of heavy hydrogen in natural water to produce some 300,000 gallons of “heavy water” to cool and moderate the site’s five production reactors. Heavy hydrogen extracted at this facility is also used in nuclear weapon components. The facility, built in 1952, has been dismantled. Debris from dismantlement included 180,000 feet of asbestos-covered piping, 150,000 square feet of asbestos-covered equipment, 140 heat exchangers, and 42 towers, each 130 feet tall. *Heavy Water Extraction Facility, Savannah River Site, South Carolina. January 8, 1994.*

OVERVIEW

During the course of nuclear weapons production and other activities, DOE and its predecessor agencies built and used more than 20,000 facilities (buildings as well as support structures and equipment). Many of these facilities became contaminated with radionuclides and/or chemical constituents. The change in the Department’s mission, and an aging infrastructure, has led DOE to evaluate the status of, and long-term plans for, many of its facilities. The facilities

Key Observations of the Surplus Facilities Legacy

- The Department of Energy has identified approximately 5,000 of its 20,000 facilities as surplus as of 1996.
- Approximately 76 percent of the surplus facilities were part of the Department’s nuclear weapons program.
- Approximately 24 percent of the surplus facilities supported chemical separation processes for nuclear weapons programs, 24 percent supported nonweapons activities, 12 percent supported weapons component manufacturing, 11 percent supported reactor fuel and target fabrication, 10 percent supported reactor operations, and of the remaining 19 percent, 9 percent supported nuclear weapons research, development and testing.
- With 1,300 and 1,200 facilities, respectively, Hanford and the Savannah River Site have the largest numbers of facilities identified as surplus. Hanford (250) and Fernald (180) have the most facilities in the decommissioning process.
- Characterization of surplus facilities is not yet complete. However, based on historical information and process knowledge, a large number of the 5,000 facilities are known or suspected to be contaminated with hazardous, toxic, and/or radioactive substances.

Figure 5-1. Surplus Facilities Categorized by Process**Notes:**

- (1) Data compiled from Office of Nuclear Material and Facility Stabilization database of surplus facilities and Office of Environmental Restoration database of release sites and other units.
- (2) Numbers of facilities have been rounded.
- (3) Nuclear weapons and nonweapons allocations to individual weapons production process categories are determined according to the methodology described in this chapter.

discussed in this report are those that the Department has identified as “surplus” to its mission. In the future, additional facilities will become surplus as they become obsolete or are no longer needed. The text box “Key Observations of the Surplus Facilities Legacy” summarizes the key observations regarding surplus facilities derived from the existing data.

Surplus facilities are managed by the Office of Environmental Management as well as other DOE program offices. Within the Office of Environmental Management, the Office of Nuclear Material and Facility Stabilization (EM-60) is responsible for stabilizing and storing nuclear materials and deactivating surplus facilities. The Office of Environmental Restoration (EM-40) subsequently manages the

Department’s decommissioning of these surplus facilities. A summary of the Department’s current process for managing surplus facilities is provided in the text box, “Surplus Facilities Management Process.”

Surplus Facilities Management Process

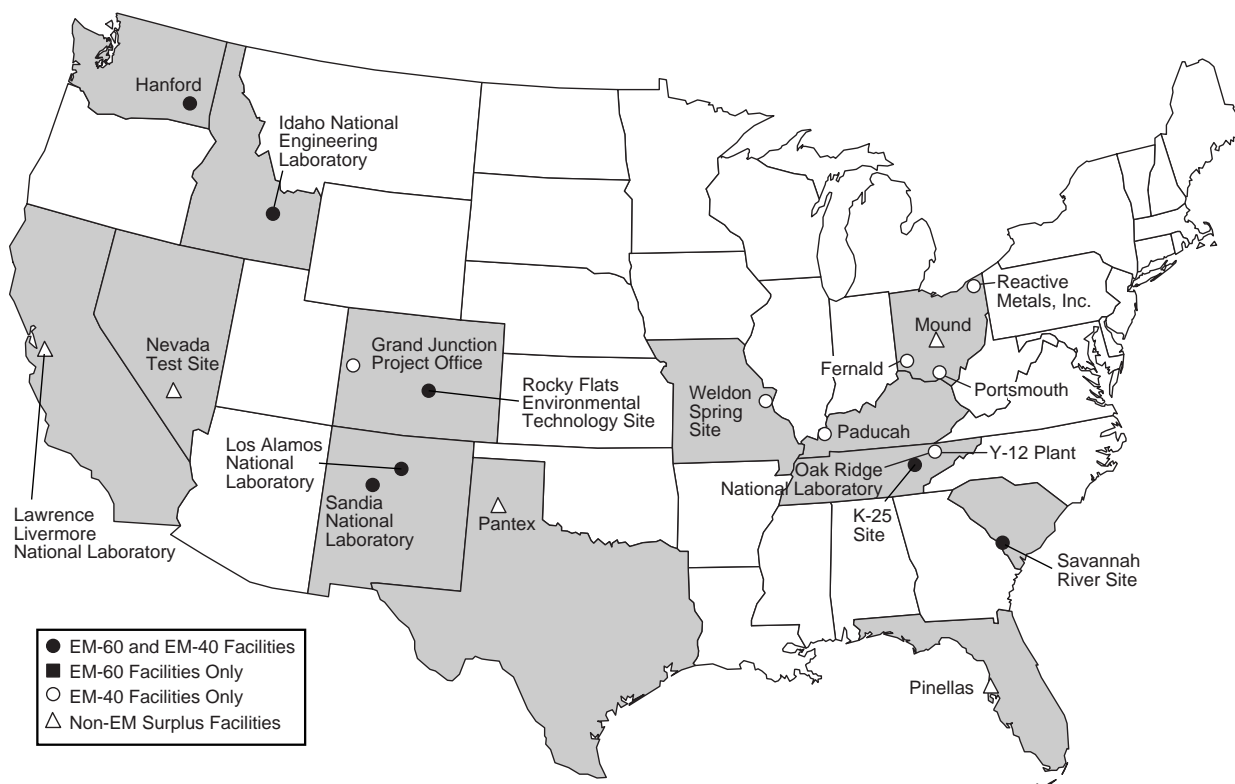
The Department’s strategy for addressing surplus facilities has been to transfer responsibility for managing them to the Office of Environmental Management when they are determined to be surplus to the needs of the Department’s primary line programs: the Office of Defense Programs, the Office of Nuclear Energy, and the Office of Energy Research. Within the Office of Environmental Management, the Department’s strategy has been a two step process: first, to stabilize the facilities to reduce the safety risks and reduce the maintenance costs; and second, to decontaminate and decommission them when it is financially and technically possible and appropriate.

The first step is managed by the Office of Nuclear Material and Facility Stabilization within the Environmental Management program. This office oversees necessary stabilization of any nuclear materials present to reduce short term risk and achieve a condition suitable for long-term storage. Upon completion of stabilization activities, this office undertakes deactivation activities to remove materials, shut down facility systems, and remove or de-energize equipment. Throughout these activities, facilities undergo surveillance and maintenance to provide early warning and prompt remediation of hazardous conditions that may develop. In some cases, where no pre-cleanup stabilization is warranted, facility responsibility may bypass the first step.

In the second step, responsibility for stabilized facilities is subsequently transferred to the Office of Environmental Restoration within the Environmental Management program. This office addresses the contamination inside the buildings and the structures themselves. Decommissioning activities may include removal of contaminated building materials and residual waste, waste treatment, complete destruction, or entombment in place.

From 1989 to 1995, responsibility for most of the largest DOE sites was transferred to the Office of Environmental Management. The Department is now considering whether to continue this process of transferring responsibility for surplus facilities from the primary line programs to these Environmental Management offices for the remaining facilities as they become surplus in the future.

Figure 5-2. Location of Surplus Facilities as of 1996



Site	Number of Facilities		
	Weapons	Nonweapons	Total
Hanford (WA)	1,200	320	1,520
Savannah River Site (SC)	1,100	73	1,173
Rocky Flats Environmental Technology Site (CO)	470	0	470
Nevada Test Site (NV)	260	40	300
Fernald Environmental Management Project (OH)	180	0	180
Mound (OH)	140	0	140
K-25 Site (TN)	88	43	131
Idaho National Engineering Laboratory (ID)	86	190	276
Los Alamos National Laboratory (NM)	58	0	58
Weldon Spring Site Remedial Action Project (MO)	47	0	47
Y-12 Plant (TN)	24	0	24
Oak Ridge National Laboratory (TN)	23	180	203
Reactive Metals, Inc. (OH)	19	0	19
Pantex (TX)	18	0	18
Sandia National Laboratory - NM (NM)	15	1	16
Grand Junction Project Office (CO)	12	7	19
Portsmouth Gaseous Diffusion Plant (OH)	8	6	14
Paducah Baseous Diffusion Plant (KY)	6	4	10
Lawrence Livermore National Laboratory (CA)	3	1	4
Pinellas (FL)	1	0	1
Nonweapons Sites (Various)	0	380	380
TOTAL	3,758	1,245	5,003
Percent	76%	24%	100%

Notes:

- (1) Data compiled from Office of Nuclear Material and Facility Stabilization database of surplus facilities and Office of Environmental Restoration database of release sites and other units.
- (2) Numbers of facilities have been rounded.
- (3) Nuclear weapons and nonweapons allocations to individual weapons production process categories are determined according to the methodology described in this chapter.
- (4) Includes a small number of facilities identified as surplus but not yet transferred into the Environmental Management Program.
- (5) EM is the acronym for the DOE Office of Environmental Management. EM-40 is the Office of Environmental Restoration which handles the decontamination and dismantlement of facilities. EM-60 is the Office of Nuclear Material and Facility Stabilization which deactivates and maintains surplus facilities.

RESULTS

The total legacy of surplus facilities identified by the Department and managed by the Environmental Management program includes about 5,000 facilities. The Office of Nuclear Material and Facility Stabilization manages approximately 78 percent of them (approximately 4,000 facilities). The Office of Environmental Restoration manages the remaining 22 percent (approximately 1,000 facilities).

Figure 5-1 illustrates the breakdown of the 5,000 surplus facilities into process categories. Approximately 76 percent of them were used for or supported nuclear weapons production activities. Chemical separations processes for nuclear weapons production account for 24 percent of the 5,000 surplus facilities. Each remaining weapons category accounts for between 4 and 12 percent of the total number of surplus facilities except for weapons operations, which accounts for less than 1 percent. Nonweapons activities account for the remaining 24 percent of DOE's surplus facilities.

The distribution of facilities among the process categories generally accounts for all historic and current uses of each facility. Facilities used for both weapons and nonweapons activities are counted fractionally according to how much of the facility was used for each purpose. If a facility was used 50 percent of the time for weapons component fabrication and 50 percent for nonweapons activities, then one-half of the facility was counted in each of those two categories. Similar results were obtained when entire facilities were allocated to single processes based on their initial purpose or their primary historical missions.

Almost 55 percent of DOE's surplus facilities are located at Hanford and the Savannah River Site (see Figure 5-2). These sites played major roles in weapons production and also contributed substantially to nonweapons DOE programs. Almost 40 percent of the surplus facilities at Hanford are attributable to



Storage shed. This mobile barn at the Idaho National Engineering Laboratory functions as a maintenance storage shed. The large cylinders in the background are spent nuclear fuel casks from Germany, Japan, and the United States. *Spent Fuel Storage Cask Testing Pad, Test Area North, Idaho National Engineering Laboratory. March 17, 1994.*



Demolition of surplus facilities. This former uranium processing building at Weldon Spring has been deactivated, decontaminated, decommissioned, and demolished. Surplus facilities at many of the Department's Environmental Restoration sites are being similarly dismantled, reducing the size of this portion of the legacy of nuclear weapons production. *Building 201 (Green Salt Plant), Weldon Spring Plant, St. Charles County, Missouri. January 29, 1994.*

chemical separations and approximately 20 percent resulted from nonweapons research and production activities. Over 55 percent of the surplus facilities legacy at the Savannah River Site resulted from chemical separations and about 5 percent resulted from nonweapons activities. Rocky Flats, Nevada Test Site, and Idaho National Engineering Laboratory also have large numbers of surplus facilities. As a result, approximately 72 percent of the surplus facilities legacy is located in the states of Washington, South Carolina, Colorado, and Idaho.

METHODOLOGY AND DATA

Data Sources

Data on surplus facilities was gathered from two sources: a database of surplus facilities compiled by the Office of Nuclear Material and Facility Stabilization for DOE's 1996 Baseline Environmental Management Report (BEMR) to Congress and a database of release sites, facilities, and other units, called the Environmental Restoration Release Site Database developed by the Office of Environmental Restoration.

The database of surplus facilities compiled by the Office of Nuclear Material and Facility Stabilization evolved from a nationwide inventory of the number and status of DOE facilities across the nation which was conducted in 1993. This inventory, known as the Surplus Facilities Inventory and Assessment (SFIA), identified a nationwide total of over 20,000 facilities, including about 5,000 that were either surplus or expected to become surplus during the next five years. The SFIA provided a foundation for updated analyses conducted by the Office of Nuclear Material and Facility Stabilization for DOE's 1995 and 1996

BEMR efforts. The database containing the results of the most recent assessment identifies about 4,000 surplus facilities and is one of two data sources used to quantify the surplus facilities legacy in this report.

Management of some of the facilities in the 1996 BEMR database has already been transferred to the Office of Nuclear Material and Facility Stabilization. Other facilities are surplus but are still managed by other DOE organizations such as the Office of Defense Programs or the Office of Nuclear Energy.

The second source of data is a database of release sites and other units managed within DOE's Office of Environmental Restoration. The Environmental Restoration Release Site Database identifies approximately 1,100 facilities, including limited descriptive data on each facility. Contaminated environmental media at many of these facilities, are discussed in Chapter 4.

Data Issues and Assumptions

The primary data sources are (1) a database of about 4,000 surplus facilities developed by the Office of Nuclear Material and Facility Stabilization and (2) a database identifying about 1,100 surplus facilities managed by the Office of Environmental Restoration.

All facilities are counted equally in this analysis. Size and extent of contamination were not considered.

Multi-use and general-purpose facilities generally were attributed to more than one process category on the basis of their current and past uses.

Decommissioning of many of the facilities listed in the Office of Environmental Restoration database is underway. Some facilities have already been decommissioned since the currently available data were compiled. In the future, the Office of Environmental Restoration expects to receive additional facilities from the Office of Nuclear Material and Facility Stabilization for decommissioning.

Limitations, Uncertainties, and Assumptions

Of the four legacy elements discussed in this report, surplus facilities are the least well documented. Unlike waste and environmental media, which are stringently regulated, easier to measure, and carefully tracked, surplus facilities have only recently become the focus of centralized planning. Because surplus

facilities are subject to fewer regulations or standards, only a limited amount of data has been compiled on a nationwide basis. As a result, the facilities analysis has several notable limitations.

The most important limitation of the facilities analysis used in this report is that all facilities were counted equally in the analysis, regardless of size or level of contamination, and a facility's risk or priority level had no impact on how it was analytically treated. DOE has compiled some data on facility size, contamination, and other characteristics in a database of all DOE facilities, the Facility Inventory Management System, for the purpose of property and asset management. However, this database does not identify which facilities are surplus, and it did not contribute to this analysis.

Another limitation of the facilities data is double-counting. A single facility could appear in both databases depending on which DOE programs are currently responsible for various activities within the facility. DOE developed the two databases for purposes unrelated to this analysis and some overlap occurred in the present analysis since the data were not intended to be aggregated. However, based on spot checks of the facilities named in the databases, DOE believes the number of double-counted facilities is small (on the order of ten) and does not affect the overall results.

The assumptions required to analyze the data came in determining the nuclear weapons process categories and nonweapons activities corresponding to each surplus facility. These determinations were based on the site where each facility is located, the activities conducted at the site and, in some cases, the activities conducted within individual facilities. In general, the assumptions made in the facilities analysis are consistent with those made for related waste and environmental media.

The most important assumption involved fractional allocations of multiple-use or general-purpose facilities. The buildings at the uranium enrichment plants, for example, were partially attributed to both



The Defense Waste Processing Facility at the Savannah River Site and other facilities currently in operation are not included in the inventory of legacy facilities in this report. Nevertheless, by introducing high-level radioactive waste into this facility when it began operating in early 1996, the Department committed itself to decontaminating and decommissioning the facility when it will have completed its mission. That mission is expected to last three decades as the facility converts 34 million gallons of high-level radioactive waste into thousands of glass logs. *Defense Waste Processing Facility, Savannah River Site, South Carolina. January 7, 1994.*

weapons and nonweapons activities, according to the number of separative work units performed for each purpose and the relative length of time each mission was performed (see text box “Methodology for Attributing Uranium Enrichment Wastes” in Chapter 3). As another example, fractions of some administrative and support buildings at Hanford and the Savannah River Site were attributed to several weapons production activities based on the overall general proportion of activities conducted at each site. The total number of facilities allocated to each activity was rounded to the nearest whole number. The approach of allocating a fraction of a facility to each of its historical uses is only one way to determine how much of the surplus facilities legacy resulted from weapons production. This approach was selected because it could be implemented with the limited data available and because it was consistent with similar approaches used to attribute waste, media, and materials in inventory to weapons and nonweapons activities. As noted above, other approaches were explored in the preparation of this report, and were found to give similar results.

SUMMARY

Approximately 5,000 surplus facilities have been identified in this study. These facilities represent the most current estimate available at the time this report was published; however, the number of surplus facilities will fluctuate over time. As operating sites shut down, additional facilities will be declared surplus, and the inventory of legacy facilities will grow; as surplus facilities become decommissioned or other facilities are reused, the inventory of legacy facilities will decrease.

